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# ANIMAL FEED INDUSTRY IN AFRICA

Background paper*

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## I. METHOD AND ORGANIZATION OF RESEARCH

1. These studies were organized through direct inquiries in a certain number of countries, viz. the Central African Republic, Rwanda, Cameroon, Togo, Côte d'Ivoire, Benin and Mali.

2. The budget and the established deadlines made it impossible to cover a larger number of countries with any degree of thoroughness.

3. In the countries visited, priority was given to visits to animal feed manufacturers and to suppliers of technology, whether local or imported.

4. This approach made it possible to focus in a specific way on the problems that are arising and to formulate proposals for solutions to immediate and medium-term concerns. The interviews were supplemented by documents supplied by technical departments in the various countries.

5. The approach used to obtain an appropriate focus on the animal feed problem in Africa south of the Sahara was as follows. Three countries were selected from among all those visited, namely Rwanda, to represent the eastern part of Africa, the Central African Republic to represent the centre, and Mali to represent the west.

6. In these different countries, the contacts that were established made it possible to analyse discrepancies between feed production and actual needs, to find out what raw materials are available and actually used, and to identify the constraints and the principal bottlenecks - in technology, in the organization of production and in the provision of information.

7. Analysing these different constraints and bottlenecks together, we were able to formulate specific proposals for animal feed production - proposals designed to improve both the quality of manufacture and the quantities produced.

8. In presenting the results obtained by subregion, we shall first take up questions of the organization of industrial production and raw material production, and of the technologies used and the principal bottlenecks encountered.

## II. GENERAL AND SPECIFIC PROBLEMS

### Potentialities and constraints by subregion (east, centre, west) in Africa

#### Central subregion: the Central African Republic

9. The Central African Republic, like all the countries of Africa south of the Sahara, has one principal objective: self-sufficiency in food production, adequate and reliable food supplies for its population through effective and independent use of the country's agricultural and livestock resources, with the development of activities such as large and small animal husbandry,

poultry production and fish pond farming. All this requires that adequate feed should be available for the animals - feed of good quality at accessible prices. At present, the Central African Republic has no animal feed production plant.

10. One consequence of this situation is that there are no animal feeds available based on clearly defined nutritional formulae and adapted to available local raw materials.

11. This being so, the growers, in particular poultry breeders, tend to make up the feed themselves on a small scale.

12. These feeds are then given to animals derived from carefully developed imported stock, the result of long and careful selection. This applies in particular to poultry.

13. These quality animals cannot yield the results expected of them unless they are raised in suitable conditions, including good food, good sanitary accommodation and a wholesome environment. Thus the establishment of a feed plant is an urgent necessity.

14. The raw materials that could be used for the production of animal feed in the Central African Republic are numerous.

15. Regrettably, most of these products - and in particular certain by-products - are not properly utilized despite their nutritional value, and despite the fact that they are available at modest prices and sometimes even free of charge.

**(A) The raw materials available locally are:**

(1) Cereals:
- Maize
- Sorghum
- Millet

16. These are seasonal crops. There is no policy aimed at encouraging production, and as a consequence the peasants simply sell the surplus remaining after immediate consumption of the rest.

Part of the cereals used for poultry growing comes from neighbouring countries, and interruptions in the availability of stocks are frequent. Prices fluctuate depending on the time of year.

(2) Animal meals:

- One such product is blood recovered in the slaughterhouse, which is boiled and dried on a cottage industry basis. Given this type of processing, the nutritional value of the product is doubtful and certainly does not match the qualities of a blood meal produced industrially;

- Another is the residue from smoked fish sold in the market-place for human consumption. The nutritional value of this product is variable; it is found only sporadically, and the quantities available are not enough to sustain any sizeable feed production.

17. However, such by-products could provide a focus for research aimed at bringing about subregional or regional cooperation in Africa. There are, after all, zones in Africa which could supply their by-products in large quantities if promoters could be sure of reliable markets for them (with payment in money or in barter).

(3) Minerals:

18. Bones and calcined oyster shells provide the main source of phosphorus and calcium.

(4) The by-products of agriculture and the agro-industries are as follows:

- Cottonseed and palm-oil cakes;
- Brewery draff;
- Rice bran;
- Treacle;
- Plantain banana skins;
- Spoilt plantain bananas;
- Spoilt cassava;
- Cassava tubers;
- Cottonseed;
- Groundnut shells (to some extent).

**(B) Imported products**

The principal imported products are:

- Vitamin-enriched mineral complement;
- Concentrates;
- Pre-mixed feed.

19. To sum up, the Central African Republic has the basic requirements and the potential for producing animal feeds. Adequate demand is also potentially there, and it will be important to satisfy that demand by encouraging the installation of medium-sized industrial units in the private sector.

20. This is virgin territory, and the objective of self-sufficiency in food supply can only be attained with effective livestock breeding, which in turn makes demands on agriculture, forestry and fishing.

Eastern subregion: Rwanda

21. In Rwanda the raw materials used for the production of animal feeds include:

- Cottonseed cake, generally imported;
- Wheat and rice bran;
- Maize, and sometimes sorghum and soya.

22. A point to be noted is that the possibilities are by no means exhausted, because certain industrial products exist which are not being utilized. These include:

- Dried brewery draff and yeast from the breweries;
- Treacle from sugar mills;
- Bran and remilled residues from flour mills;
- Rice bran from rice mills.

23. At present the main source of animal feed in Rwanda is pasture grass, various fodder crops and plants from anti-erosion hedges, consumed primarily by ruminants (cattle, goats and sheep).

24. As far as non-ruminants are concerned (chickens and pigs), Rwanda relies to a large extent on feeds produced by small-scale cottage industry or by animal feed plants such as SOPAB, COVAZ and DPE. The first of these - the Society for Animal Feed Production - is now producing 3,200 tons per year for an installed capacity of 12,000 tons per year.

25. The COVAZ Society, whose activities have been shut down, had a capacity of the order of 110 tons per day, or an annual tonnage of approximately 2,500 tons.

26. The feeds thus produced are used mainly by dairies, poultry farms and pig farms.

27. There is, moreover, a project for the development of small animal feed (DPB), with an annual production of 1,200 tons.

28. At present Rwanda could marshal immediately about 6,000 tons of agro-industrial by-products which would make it possible to produce 40,000 tons of animal feed.

29. The use of concentrated feeds is comparatively rare. Only a few growers, described as "modern", a few dairy farmers and some pig farmers purchase these feeds and give them to their animals.

30. The demand for such feeds accordingly remains slight in Rwanda, largely because the feeds are expensive and the purchasing power of the growers is low because their activities do not yield sufficient revenue.

31. As regards animals in the so-called "modern" sector, we have to estimate the consumption required to satisfy potential demand, bearing in mind that consumption per cow is estimated at 2.5 kg per animal per day, consumption by pigs at 2 kg per animal, and consumption by poultry at 125 grams per animal.

32. Thus, in 1992 the needs of the "modern" sector were estimated at 26,746 tons, a figure which is expected to rise to 50,710 tons by the year 2010. The availability of by-products would make it possible to produce about 40,000 tons of feed on condition that they were supplemented with protein-rich elements and by a greatly increased utilization of certain oilseed products; if all this proves to be possible, Rwanda should be able to attain self-sufficiency in animal feed production, since a programme for the development of oilseed products would permit the production of 38,000 tons of oilcake, from which 18,000 tons of animal feed could be produced.

33. For both the medium and the long term certain measures are being considered for the conservation and processing of animal feeds.

34. The purpose of conservation is to make feeds available at certain times when they are comparatively rare (hay storage, ensilage), and also to facilitate their use in the most appropriate forms. Conservation (storage) techniques are to be studied for brewery waste and the like.

35. As far as processing or transformation is concerned, tests are to be carried out on already familiar techniques for the enrichment of feeds. Among other things, a number of formulae for salt-licks are to be tested.

36. Two projects for additional production units are being considered in connection with the animal feed development programme:

- One unit would be situated in the region of Mutara, an area which produces a great deal of maize and which would potentially be capable of producing also soya and rice bran.

37. Moreover, this is a region which could accommodate 50,000 cattle on average to consume the animal feed thus produced.

- Another unit could be installed at Nyassibindu with a view to the eventual installation of an oilseed complex in the area, which is located in the region of Butaré; in addition to the possible production of seedcake, the region could also produce cereals, and it accommodates large numbers of cattle, pigs and poultry. The proximity of other localities such as Gikonkoro and Gitarama with large numbers of feed-consuming animals also argues for the choice of Nyassibindu as a site.

Western subregion: Mali

38. Mali is a Sahel country with an economy based largely on primary sector production: agriculture, stockbreeding and fishing.

39. In estimating the numbers of livestock in Mali, we can make the approximate assumption of one animal per inhabitant, which gives a rough figure of 9 million for total livestock.

40. Stockbreeding is prevalent in crop-growing regions and other regions exploited agriculturally, from north to south and from east to west. There are large and medium-sized undertakings as well as small family holdings. More and more individuals are moving into agriculture and stockbreeding, principally the fattening of livestock which allows profitable sales of fattened animals to the butchers.

41. All these different approaches to stock-raising require animal feed.

42. Since Mali is an agricultural country, there are numerous possibilities of finding local raw materials for the production of animal feeds, based largely on agricultural by-products, such as:

- Rice straw;
- Waste ground rice;
- Sugar cane butts;
- Sugar cane treacle;
- Cottonseed;
- Cottonseed cakes;
- Groundnut tops;
- Groundnut cake;
- Meat meal;
- Blood meal;
- Bone powder;
- Fish meal;
- Rice bran.

43. It appears from the report of Dr. Daouda Diallo (DNES/MEN) and Dr. Makan Simon Sissoko (IER/MDRE) entitled "Animal Feed in Mali: Present Situation and Future Prospects" that there are six types of animal feed in Mali which use these by-products:

1. Feeds derived from the oilseed sector;
2. Feeds stemming directly from agricultural production which undergo no processing (harvest by-products);
3. Feeds obtained directly from cereals or following the processing of cereals in agro-industrial units;
4. Animal feeds derived from the sugar sector (notably sugar cane);

5. Animal feeds derived from slaughterhouse by-products;

6. Animal feeds from the fishing sector.

44. The study cited above indicates that the oilseed sector does not provide animal feed directly but through harvest and agro-industrial by-products. This being so, we can distinguish three types of animal feed furnished by the oilseed sector:

- The defibrated cottonseed produced by CMDT;
- The groundnut and cottonseed cakes produced by the SEPAMA and HUICOMA plants;
- Animal feed properly speaking, which is produced by the mixing and conditioning operations carried out at the HUICOMA plants at Koulikoro and Koutiala.

45. CMDT (Mali Textile Development Company) is the main source of by-products for the manufacture of animal feed in Mali. Under the agriculture and livestock breeding integration programme, this Company has taken steps to make use of the by-products generated in its own area.

46. Thus, within the operations referred to above, the animal feed sector involves:

- Forage production;
- Brush hay preparation;
- Storage and use of agricultural by-products (cereal stalks, tops, rice straw);
- Utilization of cottonseed, of the HUICOMA animal feed, of treacle, and of mineral salts (salt-licks).

47. Animal feed becomes problematic in Mali during the dry season.

48. The main production factory of HUICOMA often has difficulty in meeting demand, which is on the increase.

49. This means that the quest for alternative solutions for the use of by-products, such as rice straw, is particularly important.

50. In the CMDT zone, in the region of Sikasso, experiments have been undertaken with the aim of using the residual biomass remaining after harvest as animal feeds.

51. Thus, CMDT has introduced a whole complex of agricultural products based on rice straw and other by-products available at Sikasso (Klela) and in the region of San.

## III. PROPOSALS

52. These proposals are based on an analysis of the constraints observed and, above all, on the questions raised by feed manufacturers and users in Africa.

53. They are intended to cover the short, medium and long term.

### The problems to be confronted

#### Technology and pollution

54. In Rwanda, for example, we find ourselves in a region of great population density with a habitat located on hills that are very close together.

55. What this means, among other things, is that the manufacture of components for animal feeds, such as burnt bones, leads to incidents with residents living near the site of incineration. What can be done to avoid the inconvenience caused by smoke and smell? What technology could be used - imported from abroad or designed locally?

#### Technology and concentrates

56. In the Central African Republic, an enclaved country, just as elsewhere in Africa, the problem of obtaining high-quality concentrates - which are generally imported and therefore expensive - is a major constraint. What can be done about this? Is the solution to delocalize the different elements of the manufacturing process and to organize processing in the subregions so as to be in a position to re-dictate prices to the feed manufacturers, or to set up concentrate factories in Africa in free zones?

#### Integration of animal feed and raw material production

57. In order to avoid the unfortunate effects of fluctuations in international raw material prices (notably corn and corn by-products), the question arises whether it would not be possible - in order to guarantee the quality and the availability of an important raw material such as maize - to integrate the cultivation of this product as one link in the production chain. This is what is happening with SIPRA in Côte d'Ivoire, where a 10,000-ton processing and storage silo has been set up in the production zone. Thus, for SIPRA, imported raw materials represent only 3 per cent of the feed volume and 5 per cent of the cost price.

#### Technology and subregional cooperation in Africa

58. The technologies used in Africa for animal feeds have been largely imported, but certain techniques have been developed in countries such as Nigeria and Ghana. These countries, which have developed commercial and technical relationships with Brazil and India, supply a large amount of small and medium-sized equipment which would be relevant to feed production. These items of equipment are being manufactured locally on an increasing scale; they are not costly, and they are well adapted to the African situation, both technically and with regard to cost.

59. We have seen cooperation launched between Benin and Nigeria in precisely this sphere.

60. Would it not be wise to strengthen this kind of technical and commercial cooperation for the development of animal feed production? It could be expected to stimulate livestock feed manufacture and eventually to lead to self-sufficiency in food production.

Price, quality and status of production undertakings

61. The animal feed production undertakings are either private enterprises or enterprises with a mixed public/private status, or State enterprises.

62. The State and mixed-status enterprises were the first to become operational in most cases.

63. These enterprises were obliged, to a certain extent, to provide animal feed of a given quality at a given price.

64. Competition with private undertakings is now becoming difficult, as in Mali for example, because the mixed-status enterprises have high production costs and tend to sell at prices which they fix themselves more or less arbitrarily. However, these prices, assuming that the right raw materials are used in the correct amounts, do not enable them to operate with a sufficient profit margin.

65. What can be done to remove this constraint? One of the questions that needs to be solved is related to the specialization of the State and mixed-status enterprises such as HUICOMA in Mali, which produces oil and soap on the basis of cottonseed. These enterprises could sell the by-products of their main production line to private manufacturers of animal feed. These by-products would constitute a part of the raw materials needed. This approach would make it possible to develop the production of animal feed in enterprises belonging to the private sector with the use of appropriate technology and to obtain - through the workings of competition - a product of superior quality at a reasonable price.

Short-term proposals

66. In the light of the different questions which have arisen in the course of discussions in the various countries visited, it seems reasonable to make the following short-term proposals:

- Arrange for regular information on the utilization of animal feeds and opportunities for profitable production of such feeds.

67. The information required will be determined by the nature of the relevant markets on the national and subregional plane. It should show potential promoters how to set up small, medium and large units by providing them with relevant technological information (regarding sources of material, costs, availability), information on financing, know-how and technical partnerships, and on the availability of raw materials and by-products (sources, locations, conditions for procurement), as well as opportunities for subregional cooperation.

68. This information should be organized every year in each country, and every other year in one country of a subregion whose member countries may be contemplating collaboration. The subregion information could be obtained through the holding of an agricultural fair, which would provide information among other things on stockbreeding, poultry breeding and fish farming. Such fairs should be sponsored by the feed producers, the providers of technology and potential partners from North and South.

69. Moreover, to accelerate the creation of small and medium-sized industries in the animal feed subsector, investment promotion round tables should be held in connection with these fairs every two years.

70. For the benefit of Governments and societies which might be among either existing or potential promoters, a specialized magazine for agriculture, livestock raising, forestry and fishing is to be created under the auspices and with the sponsorship of the chambers of commerce, of agriculture and of industry. This magazine will be run on a private basis and might be able to obtain subsidies and institutional support from the African Development Bank (ADB), The West African Development Bank (WADB), the Inter-American Development Bank (IADB) and the World Bank.

71. The magazine could well appear semi-annually.

Medium- and long-term proposals

72. For the medium and long term, our proposals relate to quality control, strengthening of inter-African cooperation, and the manufacture of equipment for animal feed production with a strengthening of existing plant and the installation of new large-scale plant to assemble semi-finished imported elements obtained under the delocalization scheme from countries of the North, principally, but also from the South (Brazil, India).

73. In the medium and long term Africa could consider the installation of plants for concentrate manufacture.

74. These plants would be installed in each subregion: east, centre, western forest land and the Sahel. They would be private plants with mixed participation of businessmen from the subregion concerned and from Africa as a whole, and of technical sponsors/partners from abroad.

75. The goods produced by these factories would be bought by animal feed manufacturing units in the countries of the subregion - with priority - and in Africa as a whole.

76. In the medium term, therefore, in other words from 1992 until 1997, the aim should be to promote the establishment of medium-sized manufacturing units, the specific nature of each unit depending on the raw materials available in the various zones.

77. These small and medium-sized units would replace existing cottage industry. There is really no alternative to this, as they would yield products of better quality.

## IV. PRIORITY TOPICS AND MEASURES

78. It is important that UNIDO should be able, in the context of the second industrial development decade which is now beginning, to take those actions which are most consistent with the foregoing proposals. This being so, the following recommendations could help in identifying priority measures.

Strengthening and/or establishment of efficient production units

79. It would be desirable to consider the establishment of a committee or task force for follow-up purposes. The committee would be composed of independent professional consultants with training as industrial economists, agricultural economists, veterinary economists and so on, and would have the following tasks:

- To make a list of all existing units that require "rehabilitation" and to register the projects which are being set up in the different countries. These new projects should be those which have already been the subject of a feasibility study and which are seeking appropriate technology and financing;

- To help new and old projects to get going with appropriate injections of financial support, relying to some extent on funds from the ADB, the WADb, the IADB and the Economic Community of West African States;

- To determine where subregional units for concentrate production are required (transnational enterprises) and to help set them up;

- To determine where subregional units for the manufacture of equipment for animal feed production are needed and to help set them up, beginning with equipment assembly units and subsequently going on to complete units manufactured locally.

Marketing and information

80. The measures which are to be given priority must be based on regular, carefully targeted information supplied by each country once a year.

(a) The first step is to identify the raw materials which are available in sufficient quantity in the different regions and to set up an exchange and compensation centre which would enable small and medium-sized enterprises to continue production without any interruption in the supply of raw materials, using quality input in the form of by-products, concentrates and so on;

(b) In order to enhance the demand for locally produced feeds, it will be important to invest substantial efforts in a popularization programme, relying among other things on demonstrations; it is also particularly important that the product should be available in the vicinity of prospective users once the essential advertising has been done.

81. At the same time, steps should be taken to secure high-quality animals to make effective use of the concentrate and improve the income of stock raisers; and this would also naturally increase their ability to purchase the feed.

Quality control

- Attention must be given to identifying measures and rules by which the quality of commercially feeds can be certified.

- With regard to feed manufacture, it would be important to organize a well-equipped laboratory which can perform chemical analyses of raw materials to assess their nutritional value. After manufacture, therefore, the feeds should be tested to evaluate the response of the animals consuming them, and controls and checks should be organized by an official body in order to protect users against any abuse on the part of the manufacturers.

82. To sum up, then, the laboratory (national or subregional) would perform measurements and analyses on every product described as animal feed (concentrates, forage, and agricultural and agro-industrial by-products).

Quantitative enhancement of local raw material inputs

83. For the long term, effective steps must be taken to secure an integrated development of local raw material production for animal feeds, in order to minimize the price of the final product by reducing the input costs (for concentrates, local raw materials and so on). The relatively low cost of locally produced equipment would also be a help in this respect.

84. This work should be carried out in parallel with other agricultural development projects: rice, maize and soya projects, as well as fishing, forestry and so on.